CLAIMS

What is claimed is:

1. A metallic barrier separating oxygen containing gas and hydrogen containing gas, comprising:

one or more fluidly connected pores leading from an interior of the barrier to one or more barrier surfaces.

2. The metallic barrier of claim 1, wherein the barrier surfaces are contacted by the hydrogen containing gas.

3. The metallic barrier of claim 1, wherein the barrier surfaces are contacted by the oxygen containing gas.

4. The metallic barrier of claim 1, wherein

at least a first portion of the fluidly connected pores is connected to the barrier surfaces contacted by the oxygen containing gas, and

at least a second portion of the fluidly connected pores is connected to the barrier surfaces contacted by the hydrogen containing gas.

5. The metallic barrier of claim 1, wherein the fluidly connected pores extend from the barrier surfaces contacted by the oxygen containing gas to the barrier surfaces contacted by the hydrogen containing gas.

6. The metallic barrier of claim 1, wherein at least a portion of the metallic barrier comprises a noble metal.

7. The metallic barrier of claim 1, wherein the barrier surfaces contacted by the oxygen containing gas comprise a noble metal.

8. The metallic barrier of claim 1, wherein the barrier surfaces contacted by the hydrogen containing gas comprise copper or nickel.

9. The metallic barrier of claim 1, wherein the metallic barrier comprises ceramic particles selected from the group consisting of: alumina, zirconia, and lanthanum chromite.

10. The metallic barrier of claim 1, wherein the metallic barrier comprises metal oxide particles including at least one metal selected from the group consisting of: copper, nickel, palladium, platinum, rhodium, iridium, iron, and ruthenium.

11. The metallic barrier of claim 1, wherein the metallic barrier comprises copper or nickel, and further comprises particles selected from the group consisting of: alumina, zirconia, and lanthanum chromite.

12. A method of separating gas A from gas B with a barrier, comprising the steps of:

providing the barrier made of a barrier material, such that the gases A and B are both soluble in and diffuse through the barrier material,

forming a product gas C by reacting the gases A and B with each other within the barrier material, the product gas C being substantially insoluble in the barrier material; and

venting the product gas C through a plurality of pores in the barrier material, so as to limit the pressure of the product gas C within the barrier material.

13. The method of claim 12, wherein the gas A contains oxygen, the gas B contains hydrogen, and the product gas C comprises steam.

14. The method of claim 12, wherein the barrier material is inert relative to the gases A and B and the product gas C.

15. The method of claim 14, wherein the composition of the barrier material varies according to position within the barrier such that the gases A, B and the product gas C only contact material inert to the gases A, B and the product gas C respectively.

16. The method of claim 14, wherein at least a portion of the barrier material is an electronically conductive metal.

17. The method of claim 16, wherein at least a portion of the electronically conductive metal is a noble metal.

18. The method of claim 14, wherein at least a portion of the barrier material is an oxide, ceramic or glass.

19. The method of claim 12, wherein the absolute pressure of the product gas C in one of the connected pores is higher than the absolute pressure of the gas A or the product gas C at a pore opening, such that outward flow of the product gas C prevents entry of the gas A or the product gas C.

20. The method of claim 12, wherein the absolute pressure of the product gas C in one or more of the connected pores is below a level that causes structural damage to the barrier material.

21. A solid oxide fuel cell, comprising:

a barrier having a first face, a second face, and a plurality of pores leading from an interior of the barrier to the first or second faces;

an oxygen-containing gas contacting the first face of the barrier; and

a hydrogen-containing gas contacting the second face of the barrier;

wherein the oxygen-containing gas and the hydrogen-containing gas diffuse into the barrier and react to form a mixture of steam, the mixture being vented through the pores to the first or second faces.

22. The solid oxide fuel cell of claim 21, wherein the pores are connected to the first face of the barrier.

23. The solid oxide fuel cell of claim 21, wherein the pores are connected to the second face of the barrier.

24. The solid oxide fuel cell of claim 21, wherein the pores are connected to both the first and second faces of the barrier.

25. The solid oxide fuel cell of claim 21, wherein at least a portion of the barrier comprises a noble metal.